



Study of medicinal leafy vegetables in the Rajshahi district of Bangladesh

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Study of medicinal leafy vegetables in the Rajshahi district, Bangladesh was carried out during January 2017 to December 2017. A total of ninety four (94) medicinal plants have been documented with their uses for the cure of more than 59 diseases. The medicinal plants are used by the local people to cure following the diseases, especially for anemia, asthma, burning sensation, blood disease, bronchitis, cough, chicken pox, constipation, dysentery, diarrhea, diabetes, eczema, fever, headache, itches, jaundice, menstrual disease, paralysis, piles, sex problems, skin diseases, snake-bite, toothache, worm, wound and others. Different plant parts of different spp. are used as medicine for treating various diseases. Leaf (77.66%), fruit (20.21%), root (11.70%), seed (23.40%), stem (2.13%), whole plant (21.28%), bulb (2.13%), flower (3.19%) and corm (3.19%) species were used as various diseases. This finding suggests that the leafy vegetables may possibly contain other phytochemical constituents which need to be investigated in future studies.

INTRODUCTION

Medicinal and aromatic plants constitute a major segment of the flora, which provides raw materials for use in the pharmaceuticals, cosmetics and drug industries. The indigenous systems of medicines, developed in Bangladesh for countries, make use of many medicinal herbs. These systems include Ayurveda, Siddha, Unani and many other indigenous practices (Ghani, 2003). There are many medicinally valued plant resources, which provide various kinds of drugs and medicines for various ailments in our country.

In one of the studies by the World Health Organization, it is estimated that 80 per cent of the population of developing countries relies on traditional plant based medicines for their health requirements. Even in many of the modern medicines, the basic composition is derived from medicinal plants and these have become acceptable medicines for many reasons that include easy availability, least side effects, low prices, environmental friendliness and lasting curative property. India and China are the two major producing countries, having 40 per cent of the global biodiversity and availability of rare species (Kumar and Nautiyal, 2013).

Bangladesh has very rich in bio-diversity. It has more than 500 medicinal plants species (Ghani, 2003). Over the past two decades several medicinal and ethno-botanical studies in Bangladesh have been carried out by Alam (1992); Alam *et al.* (1996); Anisuzzaman *et al.* (2007); Choudhury and Rahmatullah (2012); Faruque and Uddin (2014); Khan (1998); Khisha (1996); Rahman *et al.* (2008a, 2008b); Rahman *et al.* (2010, 2012); Rahman (2013a, 2013b, 2013c, 2013d, 2013e, 2013f, 2013g, 2013h, 2013i); Rahman and Khanom (2013); Rahman *et al.*

(2013a, 2013b, 2013c); Rahman and Parvin (2014); Rahman and Rahman (2014); Rahman and Rojonigondha (2014); Rahman (2014); Rahman *et al.* (2014) and Yusuf *et al.* (2006). In this present research article was too reported about local uses of leafy vegetables collected from traditional practitioners to cure different diseases in the Rajshahi district, Bangladesh. The present study will also help in identifying the important medicinal leafy vegetables for further investigation.

RESULTS AND DISCUSSION

The important medicinal leafy vegetables in the Rajshahi district were carried out. The survey identified and recorded 94 medicinal leafy vegetables from 27 families; used for treating 59 diseases (Table 1). The medicinal plants are used by the local people to cure following the diseases, especially for anemia, asthma, burning sensation, blood disease, bronchitis, cough, chicken pox, constipation, dysentery, diarrhea, diabetes, eczema, fever, headache, itches, jaundice, menstrual disease, paralysis, piles, sex problems, skin diseases, snake-bite, toothache, worm, wound and others. Out of 94 species was used as 59 different diseases. Dysentery, fever, skin disease, cough, inflammation, constipation, gonorrhea, piles and rheumatism were the dominant diseases in the study area. Dysentery were used 14.89% species, fever 15.96%, skin disease 10.64%, cough 11.70%, inflammation 12.76%, constipation 5.31%, gonorrhea 9.57%, piles 14.89% and rheumatism 8.58% species were used in the study area (Figure 3). Out of 27 families are used as 59 different diseases. Cucurbitaceae, Amaranthaceae, Brassicaceae, Solanaceae, Convolvulaceae, Araceae, Fabaceae, Polygonaceae and Malvaceae were dominant families in the study area. Cucurbitaceae 18.08% species were used as different diseases, Amaranthaceae 10.64%, Brassicaceae 6.38%, Solanaceae 6.38%, Convolvulaceae 6.38%, Araceae 6.38%, Fabaceae 5.32%, Polygonaceae 4.25% and Malvaceae 4.25% species were used as different diseases (Figure 1). Different plant parts of different spp. are used as medicine

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Interview with local people in the study area

Table 1 Medicinal leafy vegetables are used by the local people in the Rajshahi district of Bangladesh

Sl. No.	Scientific name	Family name	Local name	Parts used	Diseases to be treated
1	<i>Acalypha indica</i> L.	Euphorbiaceae	Muktajhuri	Leaf	Skin diseases, asthma, pneumonia, bronchitis, bedsores and infected wounds
2	<i>Amaranthus oleracea</i> L.	Amaranthaceae	Data shak	Leaf	Fever, haemorrhage, anemia or kidney complaints inflammations, boils abscesses and lung disorders
3	<i>Amaranthus polygonoides</i> L.	Amaranthaceae	Notey shak	Whole plant	Inflammations, haemorrhoids, abscesses, gonorrhea, loose motion, dysentery and swelling
4	<i>Amaranthus spinosus</i> L.	Amaranthaceae	Kantanotey	Leaf, root	Burning sensation, hallucination, eczema, leprosy, piles, bronchitis, leucorrhoea, constipation and flatulence
5	<i>Amaranthus tricolor</i> L.	Amaranthaceae	Lalshak	Leaf	Cough, dysentery, cholera and intestinal worms
6	<i>Amaranthus viridis</i> L.	Amaranthaceae	Noteyshak	Leaf, root	Burning sensation, hallucination, leprosy, bronchitis, piles, leucorrhoea and constipation
7	<i>Alternanthera sessilis</i> (L) R. Br.	Amaranthaceae	SachiShak	Whole plant	Night blindness, malaria, post natal complaints, diarrhea, dysentery and puerperal fever
8	<i>Alternanthera philoxeroides</i> (Mart.) Griseb.	Amaranthaceae	Malancha	Whole plant, leaf	Blood vomiting, constipation, night blindness and malaria
9	<i>Alternanthera bettzickiana</i> L.	Amaranthaceae	Malancha	Leaf	Anemia
10	<i>Azadirachta indica</i> A. Juss.	Meliaceae	Neem	Leaf, fruit	Skin diseases like eczema, psoriasis, worm, ringworm, itches and lice killer
11	<i>Alocasia indica</i> Schott.	Araceae	Manchu	Whole plant	Influenza, high fever, diarrhea and tuberculosis
12	<i>Amorphophalus bulbifer</i> (Roxb.) Blume	Araceae	Olkochu	Corm	Piles and gonorrhea
13	<i>Allium cepa</i> L.	Liliaceae	Piaj	Bulb	Cough, catarrh, asthma, rheumatism, colic and insect bites
14	<i>Allium sativum</i> L.	Liliaceae	Rosun	Bulb	Fevers, coughs, bronchitis, rheumatism, inflammation, leucoderma, piles, indigestion, heart diseases and wounds
15	<i>Angiopteris evecta</i> (Forst.) Hoffm.	Angiopteridaceae	Dhekishak	Frond and rhizome	Constipation
16	<i>Brassica juncea</i> L.	Brassicaceae	Rai sorisha	Leaf, seed	Arthritis, foot ache, lumbago, rheumatism and tumor
17	<i>Brassica napus</i> L.	Brassicaceae	Kalosorisha	Leaf, seed	Gout, sciatica and urticant, digestive condiment
18	<i>Brassica oleracea</i> L. var. <i>botryidis</i>	Brassicaceae	Fulkopi	Leaf	Cancer
19	<i>Brassica rapa</i> L.	Brassicaceae	Shalgam	Leaf, fruit	Cancer, chronic coughs and bronchial catarrh
20	<i>Basella alba</i> L.	Basellaceae	Puishak	Leaf, root	Gonorrhea, balanitis, urticaria and catarrhal affections
21	<i>Boerhaavia repens</i> L.	Nyctaginaceae	Punarnava	Leaf, root	Epilepsy, dysentery, jaundice, anemia, ophthalmia and gonorrhea
22	<i>Brassica alba</i> Hook.	Brassicaceae	Sada sorisha shak	Leaf, seed	Inflammatory symptoms, internal congestions, spasmodic, neuralgic and rheumatic affections
23	<i>Brassica campestris</i> Roxb.	Brassicaceae	Sorisha shak	Leaf, seed	Febrile and inflammatory symptoms, internal congestions, spasmodic, neuralgic and rheumatic affections
24	<i>Benincasa hispida</i> (Thunb.) Cogn.	Cucurbitaceae	Chalkumra	Leaf, fruit	Insanity, epilepsy and other nervous diseases, strangury and urinary calculi, heart diseases, tuberculosis, tympanites and colic pain
25	<i>Bacopa monnieri</i> (L.) Pennel.	Scrophulariaceae	BrammiShak	Whole plant, leaf	Ascites, indigestion, diarrhea, enlargement of spleen, epilepsy, insanity and scabies
26	<i>Coccinia cordifolia</i> (L.) Cogn	Cucurbitaceae	Telakucha	Whole plant	Diabetes, anorexia, epilepsy, asthma, fever, dropsy, catarrh and gonorrhea
27	<i>Coccinia grandis</i> (L.)	Cucurbitaceae	Telucha	Leaf, root	Diabetes, anorexia, epilepsy, asthma, fever,

	Voigt.				dropsy, catarrh and gonorrhea
28	<i>Cucumis melo</i> L.	Cucurbitaceae	Bangi	Fruit, seed	Ophthalmia, liver and kidney troubles, bronchitis, burning of the throat, chronic fever, painful discharges and suppression of urine
29	<i>Cucumis sativus</i> L.	Cucurbitaceae	Sosha	Leaf, fruit, seed	Throat affection
30	<i>Cucurbita maxima</i> Duch.	Cucurbitaceae	Mistikumra	Leaf, fruit	Burns, inflammations boils, migraine and neuralgia
31	<i>Cucurbita sativus</i> Duch.	Cucurbitaceae	Unknown	Leaf	Throat affection
32	<i>Cucurbita pepo</i> DC.	Cucurbitaceae	Mistikodu	Fruit, leaf, seed	Biliousness and burning sensation
33	<i>Cucurbita moschata</i> Duch.	Cucurbitaceae	Mistikodu	Leaf, fruit, seed	Biliousness and burning sensation
34	<i>Chenopodium album</i> L.	Chenopodiaceae	Botua shak	Leaf	Piles, dysentery, anorexia hiccup and intestinal ulcers
35	<i>Chenopodium ambrosioides</i> L.	Chenopodiaceae	Banbatua	Whole plant, leaf	Eczema, cholera gangrenous ulcers, pyemia, gastralgia and nervous affections
36	<i>Celosia cristata</i> L.	Amaranthaceae	Morogphul	Leaf, flower, seed	Dysentery, diarrhea excessive menstrual discharges and cough
37	<i>Corchorus capsularis</i> L.	Tiliaceae	Deshpat	Leaf, root	Dysentery, tonic, dyspepsia, liver disorders, gonorrhea and dysuria
38	<i>Corchorus olitorius</i> L.	Tiliaceae	Patshak	Leaf	Dyspepsia, liver disorders, chronic cystitis, in worms of children, hepatic and intestinal colic and gastric catarrh
39	<i>Cicer arietinum</i> L.	Fabaceae	Chola, boot	Leaf, seed	Skin diseases, gonorrhea urinary diseases and bronchial catarrh
40	<i>Centella asiatica</i> (L.) Urb.	Apiaceae	Thankuni	Whole plant, leaf	Ulcerations, eczema, leprosy, bronchitis, inflammations, fevers and convulsive disorders
41	<i>Coriandrum sativum</i> L.	Apiaceae	Doniya	Leaf, fruit	Asthenia, dyspepsia, hiccup, suppuration, piles, inflammation, gleets, jaundice, stomatitis, bleeding from the gums, scabies and tuberculosis glands
42	<i>Capsicum frutescens</i> L.	Solanaceae	Morich	Leaf, fruit	Headache, night blindness, pain, adenitis, sores, dysuria, bronchitis, chest trouble, cough and dyspepsia
43	<i>Colocasia esculenta</i> (L.) Schott	Araceae	Kochu	Leaf	Tumors, ulcerated polyp, cancer of nose and warts
44	<i>Digera muricata</i> (L.) Mart.	Amaranthaceae	Boutibon shak	Leaf, flower, seed	Biliousness, urinary discharges
45	<i>Diplazium esculentum</i> Retz	Athyriaceae	Dhekishak	Tender leaf, frond	Urinary problems and skin diseases
46	<i>Enhydra fluctuans</i> Lour.	Asteraceae	Helencha	Leaf	Ascites, dropsy, anasarca, skin and nervous affections
47	<i>Glinus oppositifolius</i> (L.) Aug. DC.	Molluginaceae	Gimashak	Whole plant	Skin diseases and suppression of the lochia.
48	<i>Hibiscus cannabinus</i> L.	Malvaceae	Mestapat	Leaf, seed	Pains, bruises, cures earache, dysentery and biliousness
49	<i>Hibiscus sabdariffa</i> L.	Malvaceae	Lalmesta	Leaf, seed	Dysentery and diarrhea
50	<i>Hygrophila auriculata</i> (Schum.) Heyne.	Acanthaceae	Puninnyashak	Leaf, seed	Diarrhea, dysentery, thirst, urinary calculi, urinary discharges, inflammations, biliousness, anemia, constipation, anuria and cough
51	<i>Ipomoea aquatica</i> Forssk.	Convolvulaceae	Kalmi Shak	Leaf, flower	Leucoderma, leprosy, fever, jaundice, biliousness, bronchitis and liver complaints
52	<i>Ipomoea batatas</i> (L.) Lamk.	Convolvulaceae	Misti Alu	Whole plant, leaf, root	Low fever skin diseases, strangury and diarrhea
53	<i>Ipomoea cairica</i> (L.) Sweet	Convolvulaceae	Unknown	Leaf	Rheumatism and inflammations
54	<i>Ipomoea indica</i> (Burm.) Merr	Convolvulaceae	Unknown	Leaf	Broken bones
55	<i>Ipomoea purpurea</i> (L.) Roth.	Convolvulaceae	Unknown	Leaf, seed	Hemorrhage and syphilis
56	<i>Ipomoea quamoclit</i> L.	Convolvulaceae	Unknown	Whole plant	Bleeding piles

57	<i>Lagenaria siceraria</i> (Mol.) Stan.	Cucurbitaceae	Panilau	Leaf, fruit, seed	Muscular pain, dry cough, piles and cholera
58	<i>Luffa cylindrica</i> (L.) Roem.	Cucurbitaceae	Dhundol pata	Leaf, fruit	Skin problems
59	<i>Lens culinaris</i> Medik.	Fabaceae	Mosur	Leaf, seed	Constipation and other intestinal affections.
60	<i>Lactuca sativa</i> L.	Asteraceae	Lettuce	Leaf	Headache, ophthalmia, prevents fall of hairs and inflammation
61	<i>Lasia spinosa</i> (L.) Thw.	Araceae	Kanta kachu	Leaf	Throat affections and piles
62	<i>Momordica charantia</i> L.	Cucurbitaceae	Korola	Fruit, leaf	Body pain, diabetes, urinary disorder, fever and Jaundice
63	<i>Momordica dioica</i> Roxb.	Cucurbitaceae	Kakrolshak	Leaf, fruit	Bleeding piles, urinary complaints, hypertension Diabetes mellitus and skin disease
64	<i>Mollugo pentaphylla</i> L.	Molluginaceae	Tita shak	Leaf	Asthma, mouth infections and eye diseases
65	<i>Mollugo spergula</i> L.	Molluginaceae	Gima shak	Whole plant	Sore legs and menstrual discharge
66	<i>Malva verticillata</i> L.	Malvaceae	Napashak	Leaf	Disorders of the skin, gastrointestinal tract and respiratory tract
67	<i>Moringa oleifera</i> Lamk.	Moringaceae	Sajna	Leaf, fruit	General weakness, blindness, headache, paralysis and gastric problem
68	<i>Momordica cochinchinensis</i> Roxb.	Cucurbitaceae	Kakrol	Whole plant, leaf, fruit	Heart disease, lumbago, ulceration and fracture of bones
69	<i>Marsilea minuta</i> (L.) Mant.	Marsileaceae	Susnishak	Whole plant	Cough, respiratory troubles, hypertension, sleeping disorders and headache
70	<i>Marsilea quadrifolia</i> L.	Marsileaceae	Susnishak	Whole plant	Snakebite, abscesses
71	<i>Oxalis europea</i> L.	Oxalidaceae	Amrul	Leaf	Fevers, dispel boils and abscesses
72	<i>Oxalis corniculata</i> L.	Oxalidaceae	Amrul	Leaf	Cough, scabies, itches, dysentery, anemia, piles, dyspepsia and fever
73	<i>Portulaca oleracea</i> L.	Portulacaceae	Borononia shak	Leaf, stem, seed	Scurvy, diseases of the liver, spleen, kidney and bladder, dysuria, hematuria, gonorrhea, dysentery and sore nipples
74	<i>Portulaca quadrifida</i> L.	Portulacaceae	Chotononia shak	Leaves, stem, seed	Piles, on balds, scalds, swellings, erysipelas, skin diseases and rheumatism
75	<i>Pisum sativum</i> L.	Fabaceae	Motor	Leaf, seed	Phlegm and burning of the skin
76	<i>Phyllanthus niruri</i> L.	Euphorbiaceae	Vuiamla	Whole plant	Problems of the stomach, genitourinary system, liver, kidney and spleen
77	<i>Paederia foetida</i> L.	Rubiaceae	Gondho Vaduli	Leaf, root	Liver, stomach troubles, lumbago, diarrhea and dysentery
78	<i>Rumex vesicarius</i> L.	Polygonaceae	Chukapalong	Leaf, fruit	Heart troubles, tumors, constipation, hiccup, flatulence, asthma, bronchitis and piles
79	<i>Rumex dentatus</i> L.	Polygonaceae	Bon Palong	Root	Coetaneous disorders
80	<i>Rumex maritimus</i> L.	Polygonaceae	Bon Palong	Leaf, seed	Ringworms and skin diseases
81	<i>Rumex sanguineus</i> L.	Polygonaceae	Unknown	Seed	Pain of back and lumber region, cures gleet
82	<i>Solanum americanum</i> L.	Solanaceae	Tit Begun	Twig and fruit	Hepatitis B
83	<i>Solanum nigrum</i> L.	Solanaceae	Tit Begun	Leaf, fruit	Chronic enlargement of the liver, piles, dysentery, skin diseases; anasarca, heart diseases, hiccup, asthma, fever, diarrhea and bronchitis
84	<i>Solanum indicum</i> L.	Solanaceae	Tit Begun	Leaf, fruit	Diabetes, asthma, dry cough, catarrh, colic, flatulence, worms, dysuria, toothache and fever
85	<i>Solanum villosum</i> L.	Solanaceae	Tit Begun	Leaf, fruit, root	Stomachache, fever, hypertension
86	<i>Solanum filisifolium</i> L.	Solanaceae	Tit Begun	Whole plant	Spleen, cough
87	<i>Spinacea oleracea</i> L.	Amaranthaceae	Palongshak	Whole plant, leaf	Fevers, scalding urine, joint pain, inflammations of the lungs and bowels
88	<i>Trichosanthes anguina</i> L.	Cucurbitaceae	Chichinga	Whole plant	Boils, intestinal worms, skin diseases, bronchitis and asthma
89	<i>Trichosanthes bracteata</i> Lam.	Cucurbitaceae	Makal	Leaf, fruit	Hemicrania, weakness of limbs, ophthalmia and leprosy
90	<i>Trichosanthes dioica</i>	Cucurbitaceae	Potol	Leaf, fruit, root	Catarrh, dysentery, diarrhea, bronchitis and to arrest bleeding from bruises, and for the

	Roxb				restoration of hairs
91	<i>Thyphonium trilobatum</i> (L.) Schott	Araceae	Bhotkochu	Corm	umors, haemorrhoids and piles
92	<i>Vigna mungo</i> (L.) Hepper	Fabaceae	Mashkalai	Leaf, seed	Piles, asthma, leucoderma, scabies, gonorrhea, pains, epistaxis, paralysis, rheumatism, affections of the nervous system, liver and cough
93	<i>Vigna sinensis</i> (L.) Endl.	Fabaceae	Borboti	Leaf, seed	Jaundice
94	<i>Xanthosoma atrovirens</i> L.	Araceae	Moulvi kochu	Leaf	Food allergies

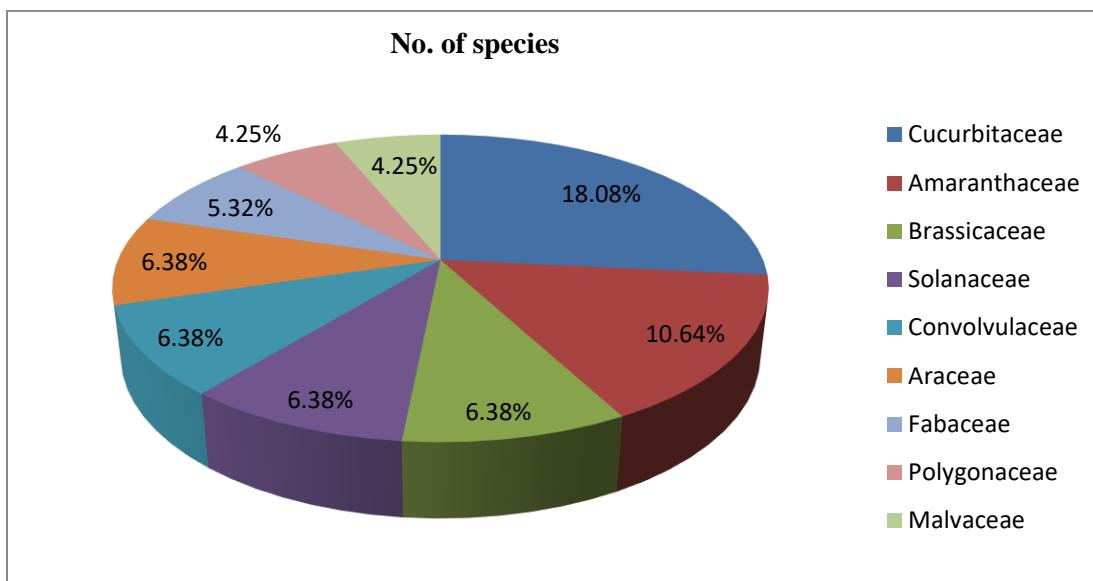


Figure 1 Recorded dominant medicinal plant families in the study area

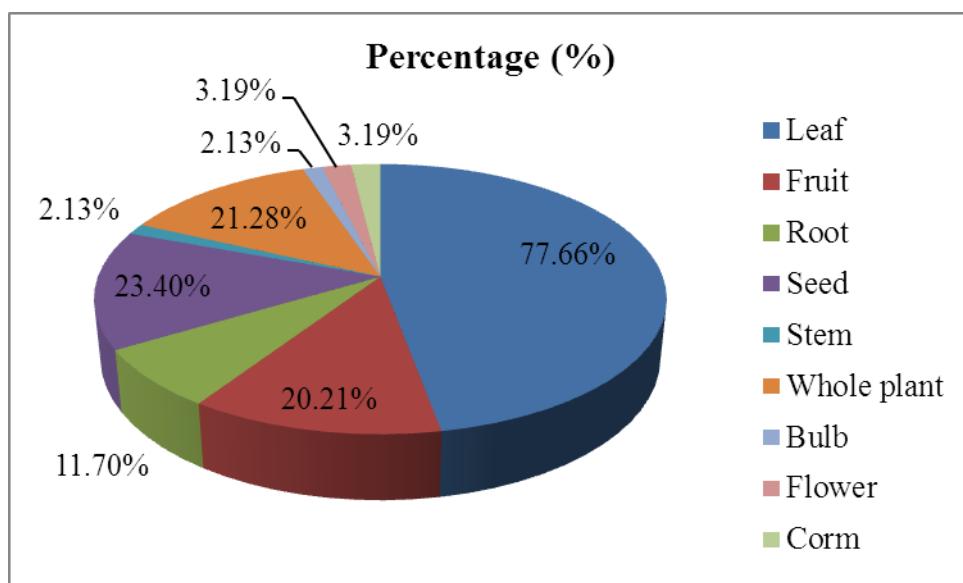


Figure 2 Recorded plant parts used as various diseases

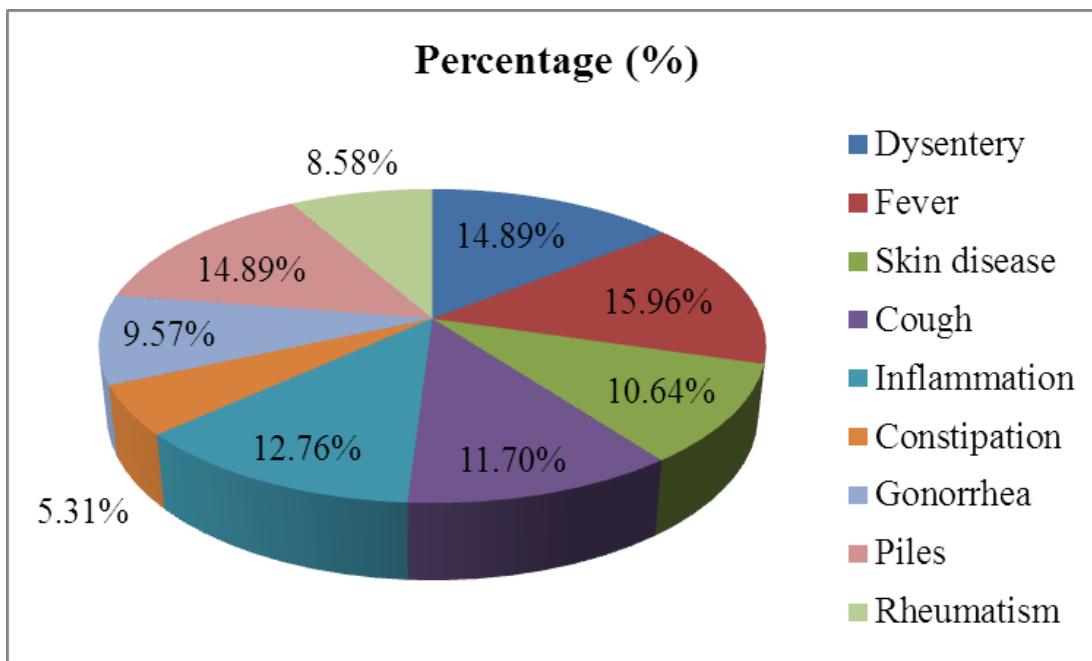
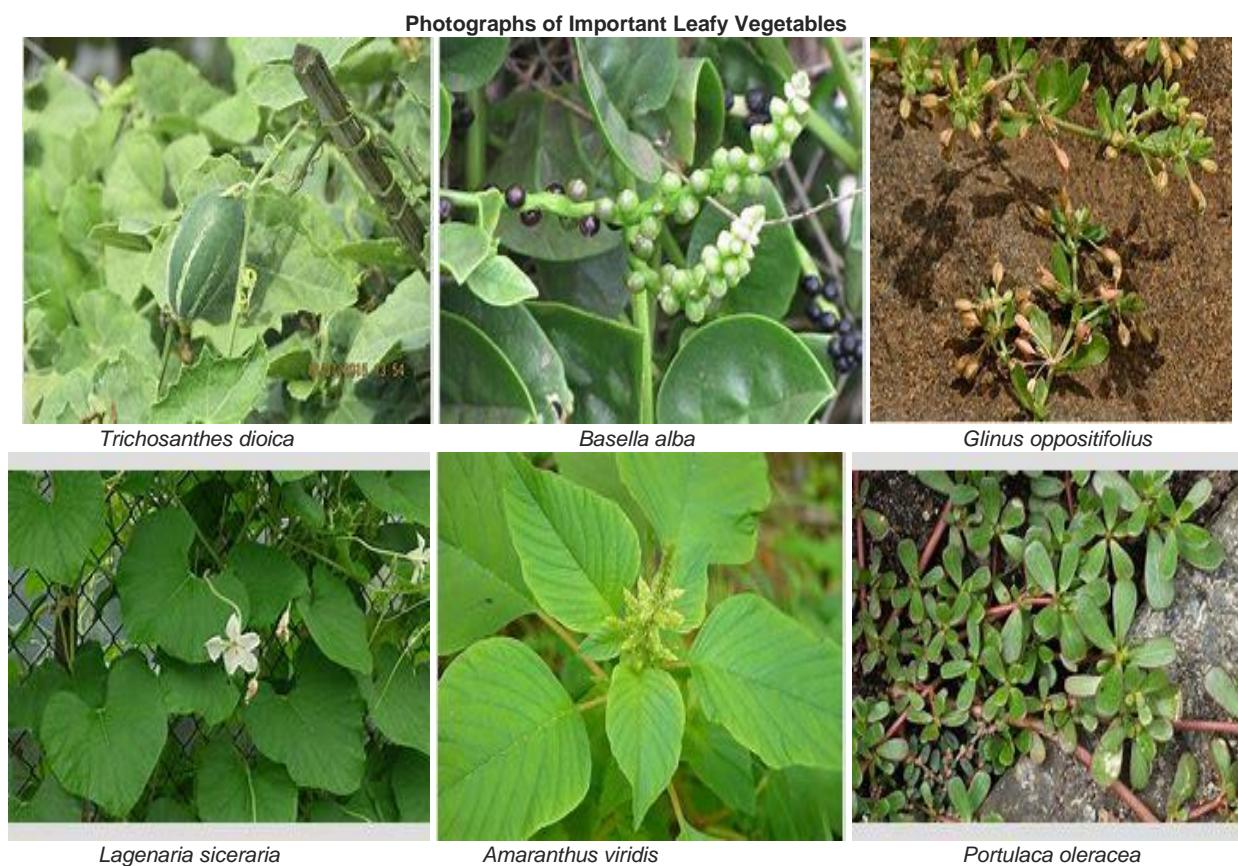


Figure 3 Recorded dominant diseases in the study area



*Moringa oleifera**Ipomoea aquatica**Ipomoea batatas**Chenopodium album**Colocasia esculenta**Enhydra fluctuans*

for treating various diseases. Leaf (77.66%), fruit (20.21%), root (11.70%), seed (23.40%), stem (2.13%), whole plant (21.28%), bulb (2.13%), flower (3.19%) and corm (3.19%) species were used as various diseases (Figure 2). This finding of common medicinal plants in the study is in agreement with Yusuf *et al.* (2006), Khatun *et al.* (2013), Alam *et al.* (2003), Ahmed and Gani (2010), Ghani (2003), Faruque and Uddin (2014), Nahar *et al.* (2016) and Jamila and Rahman, (2016). The present study revealed that medicinal plants still play an important in the primary health care of the rural communities. The information gathered from the local traditional healers are useful for further researchers in the field of ethno-botany, taxonomy and development of new drug from natural resources.

CONCLUSION

Studies of medicinal leafy vegetables in the Rajshahi district, Bangladesh were carried out during January 2017 to December 2017. A total of ninety four (94) medicinal plants have been documented with their uses for the cure of more than 59 diseases. Finally, to conclude, this research article will attract the attention of ethno-botanists, phytochemists and pharmacologists for further critical investigation of medicinal leafy vegetables presents in the Rajshahi district of Bangladesh.

MATERIALS AND METHODS

Study area: Rajshahi district is located at 24°22'23.91"N, 88°36'E which belongs to Bangladesh. Its covers an area of 2407 sq. km, is bounded by Naogaon District to the North, Natore District to the East, Chapai Nawabgong District to the West and the the river Padma to the South. It's commonly known as "Barriad Track". It consist of 9 upazilas, 4 Thanas, 13 Municipalities, 147 Wards, 297 Mahallas, 70 union parishads, 1678 Mouzas and 1858 villages. The climate of Rajshahi is not characterized by great extremes of heat, cool and rainfall owing of the geographical situation of the district which ensures against the direct action

of disturbing influences such as the sea in the south, the strong monsoon current in the east, and Himalayas to the north. The hot season commences early in the March with the cessation of the northerly wind. The winter begins from the middle of the October. Some other meteorological parameters are wind direction and sunshine. Normally there is very little discernible wind from the October to February. From the beginning of March the sun shifts from south to northern direction and day temperature increases and becomes windy. Thunderstorms locally named "Kal Baishaki" with heavy rainfall and sometimes with hailstorms starts at the end of March and continues up to the end of May. The prevailing South-West monsoon wind brings heavy rainfall for the south region of the country at the early June (BPC, 2001).

Data collection: Frequent field trips were made for the documentation of medico-botanical knowledge during January 2017 to December 2017. During the field interview, the information was noted in the documentation data sheet. All the information regarding plant species, biological forms, habitat, local names and uses were documented. Medicinal information was obtained through semi-structured interviews with knowledgeable people such as local Kabiraj and elderly people. Plant specimens were collected with flowers and fruits and processed using standard herbarium techniques (Alexiades, 1996).

Identification: The collected specimens were identified studying taxonomic books and booklets from the library of Rajshahi University. The collected materials were identified and described up to species with the help of Hooker (1877); Prain (1903); Kirtikar and Basu (1987); and Ahmed *et al.* (2008-2009). For the current name and up-to-date nomenclature Huq (1986), and Pasha and Uddin (2013) were consulted.

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